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# DEVICE FOR SCREENING FUMIGANTS

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A satisfactory solution to the problem of disinsectizing aircraft would be to circulate in the air-conditioning system a fumigant that is nonirritating and harmless to passengers and crew (2, 3). To aid in the search for such a fumigant a new device for screening solid or liquid insecticides with a relatively high vapor pressure was developed. This device is simple, easy to clean, inexpensive, reduces contamination, speeds tests, and is compact and portable. Because it is a closed system it cuts down toxicity hazards and lends itself to thermostating. The results are more reproducible because of agitation.

## Equipment

The equipment is shown in figure 1. Two Mason jars with rubber gaskets are joined in a closed system by soldering the screw-cap metal rims. The upper jar contains the test insects and is separated from the lower jar by a wire screen. The lower jar contains the insecticide distribution assembly, consisting of a brass rod with a disk of filter paper held in place by paper clips, two fans with pitched vanes one mounted above and the other below the filter paper, and a steel bar centered near the lower end. The bottom of the rod rotates on a bearing made by drilling an impression in the center of the jar bottom. An enlarged mesh in the center of the screen serves as the upper bearing. The stirrer assembly was energized by placement on a magnetic stirrer.

## Operation

To check distribution, cigarette smoke was blown into the lower chamber and the time necessary for uniform distribution in both chambers under high-speed agitation was determined by visual observation. Approximately 30 seconds were required to distribute the smoke evenly between the upper and lower chambers.

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[1] Donald Whittam, of the Plant Pest Control Branch, assisted in this work.

To 25 mg. of the test insecticide 100 ml. of acetone was added, and 1 ml. of this solution was distributed with a pipette over the filter paper. The acetone was allowed to evaporate in a hood. The stirrer assembly was then set in place in the lower Mason jar, and 20 normal-strain house flies 3 to 5 days old were introduced into the upper jar. The jars were then joined and placed on the magnetic stirrer. The speeds of rotation used were 800-900 and 300-400 r.p.m. These ranges include data obtained with two assemblies used interchangeably with two stirrers. The higher speed was adopted for later use, although it is not critical. All tests were run at a room temperature of 75° F.

A study was made of the time needed to knock down 5, 50, 90, and 100 percent of the house flies exposed to the lindane vapor produced by high- and low-speed stirring, and also when no agitation was used. In another series of tests chlordane was compared with lindane under high-speed stirring. All tests were repeated several times.

As shown in figure 2, lindane is approximately five times as effective as a fumigant as chlordane. These results agree well with those of Hoffman and Lindquist (1). The knockdown was much more rapid when stirring was used. There was no mortality when house flies were held for 4 hours without treatment.

## Literature Cited

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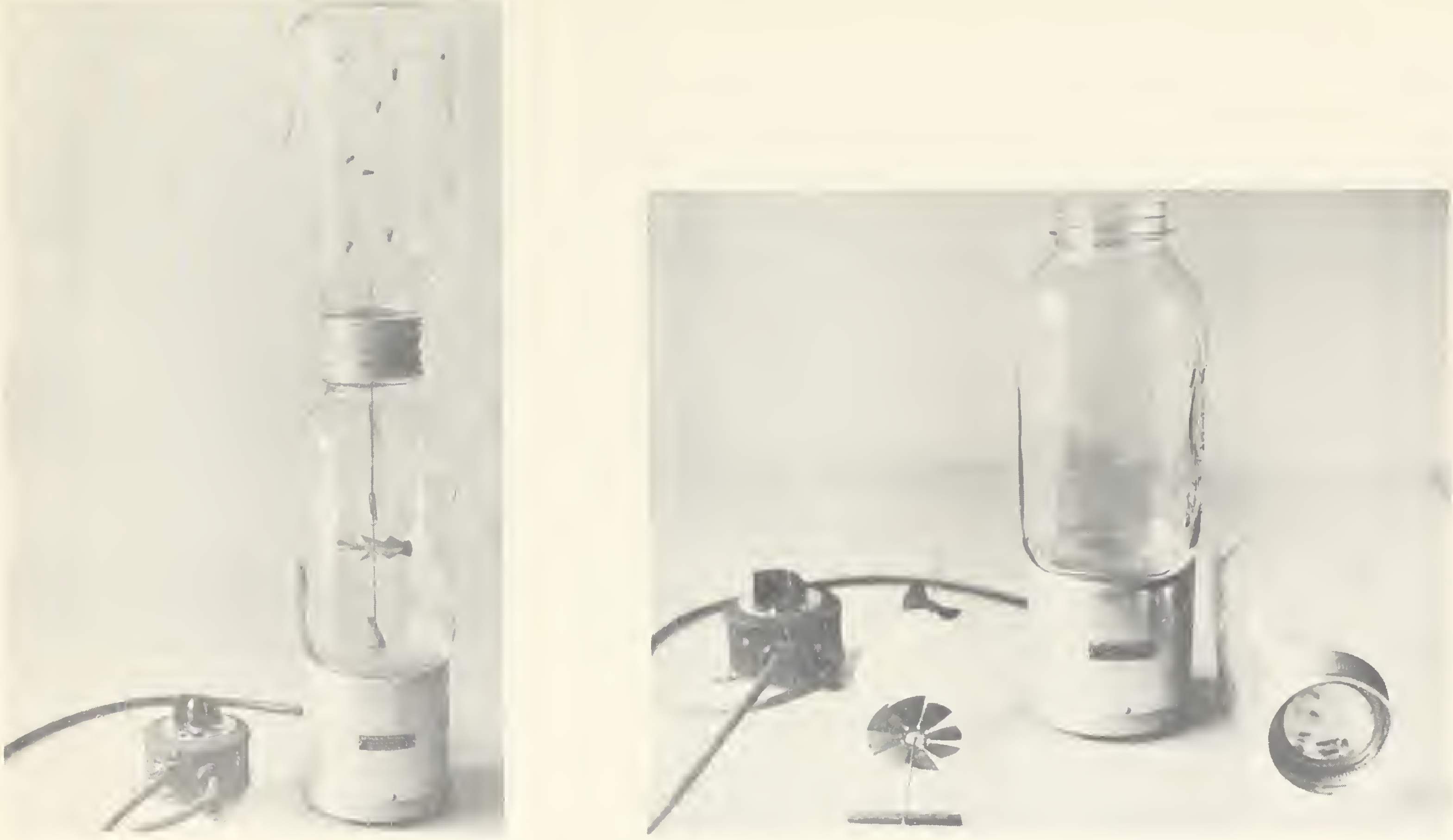

Figure 1.--Device for screening fumigants.

At left, assembled. Flies have been introduced into the upper jar, and the dispersing unit containing the treated filter has been set in place in the lower jar.

At right, disassembled. Shows the blades of the two fans, the filter-paper mounting, and the screen separating the two jars.

The rheostat regulates the speed at which the magnetic stirrer turns the dispersing unit.

(Photographs by H. W. White, of the Forest Service)

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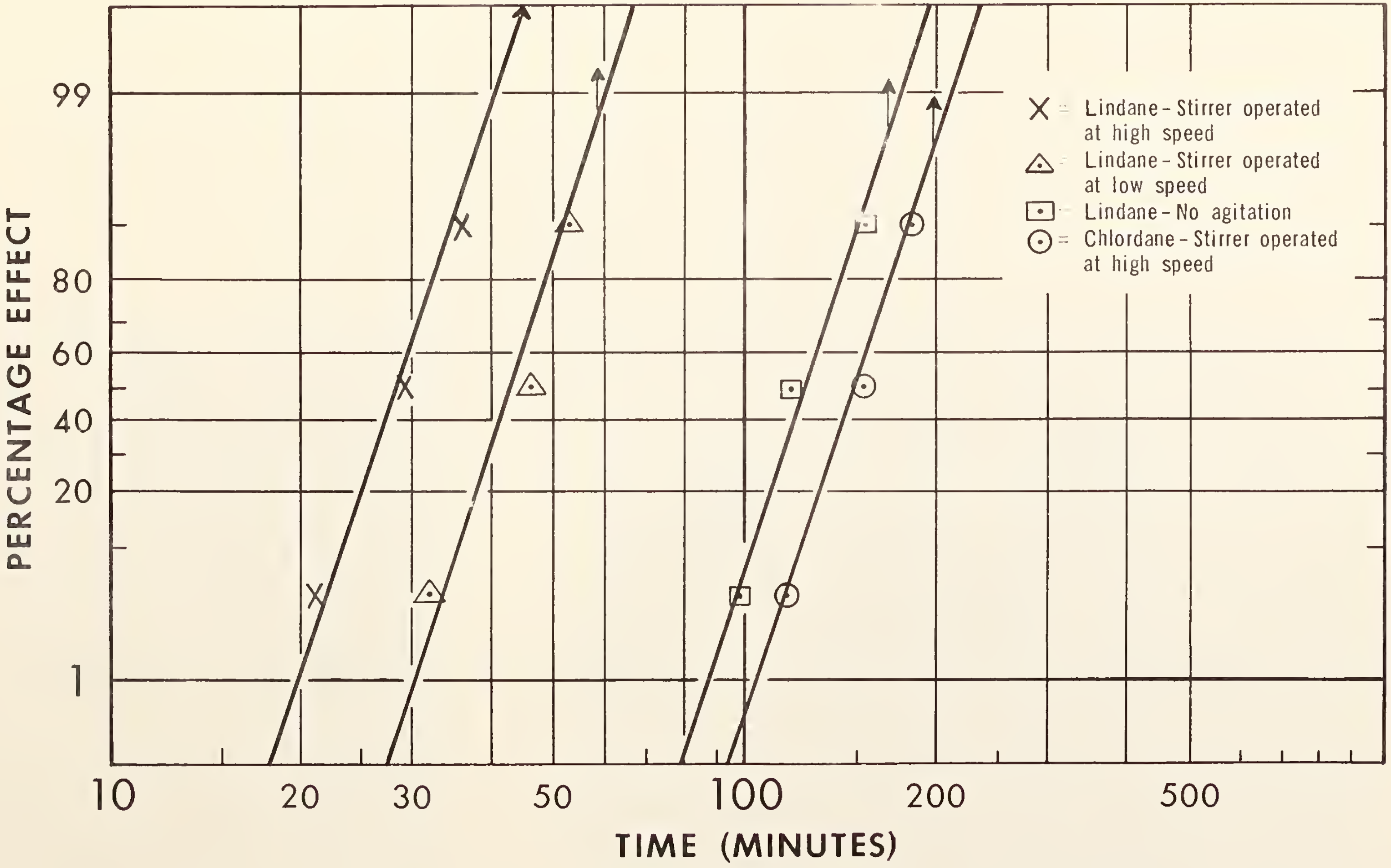

Figure 2.--Speed of knockdown of house flies by lindane and chlordane as measured by the magnetic-stirrer method.